CLAIMS

What Is Claimed Is:

1. A method for determining an amount of energy released by a thermally responsive snap-action bimetallic actuator, the method comprising:

presenting a thermally responsive snap-action bimetallic actuator to a sensing portion of a force sensing device while the actuator is configured in a first pre-snap state wherein a mobile portion of the actuator is spaced away from the sensing portion of the force sensing device; and

determining a force generated by the actuator during transit to a second post-snap state wherein the mobile portion of the actuator is moved into forceful contact with the sensing portion of the force sensing device.

2. The method of claim 1 wherein presenting the actuator to the sensing portion of the force sensing device includes thermally activating the actuator to transit to the second post-snap state.

3. The method of claim 1 wherein presenting the actuator to the sensing portion of the force sensing device includes placing the actuator on a support structure configured to support the actuator.

4. The method of claim 1 wherein determining a force generated by the actuator includes detecting a peak force generated by moving the mobile portion of the actuator into forceful contact with the sensing portion of the force sensing device.

5. The method of claim 1 wherein presenting the actuator to the sensing portion of the force sensing device includes positioning the actuator in proximity to a thermal stage and activating the thermal stage.

6. The method of claim 5 wherein activating the thermal stage includes activating the thermal stage in a controlled manner.

7. The method of claim 6 wherein determining a force generated by the actuator includes determining an energy-temperature rate relationship exhibited by the actuator.

8. The method of claim 7, further comprising assembling the actuator into operative relationship with a movable indicator portion of a thermal sensing device.

9. A method for determining a force generated by a thermally responsive snap-action bimetallic disc during transit between first and second states, the method comprising:

presenting the thermally responsive snap-action bimetallic disc to a force indicator on a support structure while a mobile portion of the disc is positioned on one side of a substantially immobile edge portion opposite from the force indicator, the disc being presented sufficiently closely to the force indicator that the mobile portion is positioned to forcefully interact with a sensing portion of the force indicator during transit to a second side of the edge portion proximate to the force indicator;

changing a temperature of the disc to transit the mobile portion into a position on the second side of the edge portion proximate to the force indicator; and

sensing with the sensing portion of the force indicator a peak force generated by the transit of the mobile portion.

10. The method of claim 9 wherein changing the temperature of the disc includes changing a temperature of the support structure.

11. The method of claim 9 wherein changing the temperature of the disc includes changing the temperature at a controlled rate.

12. The method of claim 9 wherein the temperature of the disc is below an actuation temperature of the disc prior to changing.

13. The method of claim 12 wherein changing the temperature of the disc includes increasing the temperature above the actuation temperature.

14. The method of claim 9 wherein presenting the disc to the force indicator on a support structure includes simulating a portion of a structure intended to support the disc during operation in a temperature sensing device.

15. The method of claim 9 wherein changing a temperature of the disc to transit the mobile portion into a position on the second side of the edge portion proximate to the force indicator includes generating a force with the mobile portion of the disc.

16. The method of claim 15 wherein sensing a peak force generated by the transit of the mobile portion includes applying the force generated with the mobile portion of the disc to the sensing portion of the force indicator.

17. A method for determining an amount of energy released by a thermally responsive snap-action bimetallic disc, the method comprising:

forming a bimetallic disc having a mobile center portion surrounded by a substantially immobile peripheral portion;

qualifying an energy released by transit of the mobile portion from a first side of the peripheral portion to a second opposite side of the peripheral portion during operation of a snap action; and

subsequently assembling the disc into operative relationship with a movable indicator portion of a sensing device.

18. The method of claim 17 wherein qualifying the released energy includes thermally activating the disc in the presence of a force sensing device.

19. The method of claim 18 wherein qualifying the released energy further includes moving the mobile portion of the disc into contact with an operational portion of the force sensing device during transit of the mobile portion from the first side to the second side of the peripheral portion.

20. The method of claim 19 wherein thermally activating the disc includes one of heating and cooling the disc.

21. The method of claim 19 wherein qualifying the released energy includes determining a minimum force applied to the operational portion of the force sensing device during transit of the mobile portion of the disc.

22. The method of claim 19 wherein qualifying the released energy includes thermally activating the disc at a controlled rate of temperature change.

23. The method of claim 22 wherein qualifying the released energy includes thermally activating the disc at a plurality of different controlled rates of temperature change.

24. An energy measuring device comprising:

a means for supporting a bimetallic member in a first pre-snap state;

a means for qualifying an energy released by the bimetallic member during transit from the first pre-snap state to a second post-snap state, the qualifying means being positioned relative to the supporting means to be engaged by the bimetallic member in the second post-snap state; and

a means for thermally activating the bimetallic member, the thermally activating means being positioned relative to the supporting means for thermally activating the bimetallic member to transit from the first pre-snap state to the second post-snap state.

25. The device of claim 24 wherein the means for qualifying the released energy includes means for measuring a force generated by the bimetallic member.

26. The device of claim 25 wherein the means for measuring a force generated by the bimetallic member includes means for measuring a peak force generated by the bimetallic member during the transit from the first pre-snap state to the second post-snap state.

27. The device of claim 24 wherein the thermally activating means includes means for thermally activating the bimetallic member in a controlled manner.

28. The device of claim 27 wherein the means for thermally activating the bimetallic member in a controlled manner includes means for heating or cooling the bimetallic member at a controlled rate of temperature change.

29. The device of claim 24 wherein the means for supporting the bimetallic member in the first pre-snap state includes means structured to support a substantially immobile peripheral portion of the bimetallic member while a substantially mobile portion of the bimetallic member that is located centrally to the peripheral portion is disengaged from the qualifying means.

30. A bimetallic actuator testing device comprising:

a force indicator;

a support structure that is spaced a predetermined distance away from the force indicator; and

a thermal stage positioned relative to the support structure for changing a temperature of the support structure.

31. The testing device of claim 30 wherein the support structure that is spaced relative to the force indicator such that a bimetallic actuator that is configured in a first pre-snap state may be placed thereon and such that, when actuated to a second post-snap state, the bimetallic actuator contacts the force indicator.

32. The testing device of claim 30 wherein the support structure includes an annular land spaced above a base, the land being sized to support a peripheral edge portion of the bimetallic actuator above the base.

33. The testing device of claim 30, further comprising an intermediary member suspended between the support structure and the force indicator, the intermediary member being structured to transmit a force generated by the bimetallic actuator to a force sensing surface of the force indicator.

34. The testing device of claim 30 wherein a force sensing portion of the force indicator is positioned to sense peak force generated by the bimetallic actuator by transiting between the first pre-snap state and the second post-snap state.

35. The testing device of claim 30 wherein the force indicator is structured to display a value of the peak force.

36. The testing device of claim 30 wherein the force indicator is a conventional pressure-sensing transducer.

37. A device for testing a force generated by transit of a thermally responsive bimetallic disc between a first pre-snap state and a second post-snap state, the bimetallic disc being configured with a substantially round immobile edge portion positioned peripherally to a mobile center portion that extends on a first side of the edge portion when the disc is configured in the first pre-snap state and transits with a snap-action in response to a predetermined set-point temperature through the edge portion to extend on a second side of the edge portion, the testing device comprising:

a columnar support structure having a first annular support surface sized to support the edge portion positioned peripherally to a mobile center portion of a thermally responsive bimetallic disc;

a force indicator having a force sensing surface positioned relative to the support structure to be forcefully engaged by the mobile center portion of the thermally responsive bimetallic disc when the mobile center portion transits with a snap-action in response to a predetermined set-point temperature through the edge portion from a first side of the edge portion to extend on a second side of the edge portion; and

a thermal stage positioned relative to the support structure to induce the predetermined set-point temperature in the thermally responsive bimetallic disc supported on the support structure.

38. The testing device of claim 37 wherein the thermal stage is positioned adjacent and in close proximity to the support structure.

39. The testing device of claim 38 wherein the force indicator is suspended opposite the thermal stage.

40. The testing device of claim 37 wherein the force indicator is a pressure-sensing transducer of a type that is capable of sensing a peak force applied to the force sensing surface.

41. The testing device of claim 40 wherein the pressure-sensing transducer is of a type that is capable of displaying the value of the peak force in a useful manner.

42. The testing device of claim 37, further comprising a drive member positioned intermediately between the annular support surface of the support structure and the force sensing surface of the force indicator for transmitting a force generated when the mobile center portion of the bimetallic disc transits with a snap-action through the edge portion from the first side of the edge portion to extend on the second side of the edge portion.

43. The testing device of claim 42 wherein the columnar support structure includes a second annular support surface spaced away from the first annular support surface toward the force sensing surface of the force indicator and sized having an interior dimension larger than the edge portion of the bimetallic disc; and

further comprising a spacer that engages the second annular support surface and cooperates with the first annular support surface to form an annular groove within which the peripheral edge portion of the bimetallic disc is captured, the spacer including an aperture with which the drive member is slidingly engaged for motion between the annular support surface of the support structure and the force sensing surface of the force indicator.

44. The testing device of claim 43 wherein the drive member and the spacer are sized such that a first end portion of the drive member is positioned by the spacer to contact an inner concave surface of the bimetallic disc when the disc is configured in a first pre-snap state and installed into the annular groove, and a second end portion of the drive member is

positioned by the spacer to engage the force sensing surface of the force indicator when the disc is configured in a second post-snap state.